iGEM 2014

WEEKLY NEWSLETTER

iGEM 2014
Weekly newsletter

NEWSLETTER N°3

from July 28th to August 10th 2014

ETH Zürich
Goettingen
Gothenburg
Paris Bettencourt 2014

Polytechnic University of Valencia
TJU-China iGEM Team
UI-Indonesia
USTC_China iGEM team

NEWSLETTER N°3

from July 28th to August 10th 2014

NJU-QIBEBT
CAU-China
Tongji
SYSU-China
XMU-CHINA
Nagahama
USTC-China
Tsinghua-A

BRAWIJAYA UNIVERSITY
ZJU-China
WHU-CHINA
Tianjin University
NEAU-Harbin

NEWSLETTER N°3

from August 25th to September 7th

GOETTINGEN

iGEM Göttingen 2014

PROJECT UPDATE

Last month, we had a barbecue for our iGEM team the day after we had another barbecue with the whole GZMB (the Center for Molecular Biosciences in Göttingen) and aside from the delicious meal, many funny things happened.

First there was our attempt to warm our bread (it was couple of baguettes) on the grill that ended with the bread being actually grilled along with the meat. Then, at some point sambuca was being served in shot glasses and eventually also on the table. And there was also a rabbit. One of our lab mates saw it first and, very discretely, proceeded to shout "A rabbit!, a rabbit!", and Mr. Rabbit was just chilling on the grass, looking at us humans finally enjoying ourselves after so many weeks of pipettes and Petri dishes –which of course is not to say that we don't enjoy ourselves with our pipettes and Petri dishes, but only that Mr. Rabbit saw us enjoying ourselves after that-. Some started to get close to get a picture of that shy and wonderful display of nature. A prudent voice then mentioned the risks of getting close to the Killer Rabbit of Caerbannog, but no one really seemed to listen. Then one of our lab mates got too close and Mr. Rabbit decided to retreat.

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iGEM

NEWSLETTER N°3

from August 25th to September 7th

LIKA-CESAR-BRASIL

OUR HUMAN PRACTICE

The LIKA-CESAR-BRASIL is participating of iGEM human practices. For this porpose, our first action was to organized The First Workshop in Synthetic Biology and Technology Innovation in Recife. The focus of the workshop was the integration among Robotics, Health, Genetics and Information Technology.

Also for the human practices, the team conducted the campaign against breast cancer in Dona Lindu Park and Boa Viagem Beach. We also enjoying coconut water, sea and a beautiful blue sky. Besides taking advantage of the natural scenery, we spread information about our work and advances in synthetic biology! Working and having fun is our motto! The survey of breast cancer is available at this link for women from 18 years: https://pt.surveymonkey.com/s/prevcamama. The purpose of the questions is whether the women prevent breast cancer by making periodic examinations. The survey will continue to be applied until September and the results will be presented during the competition.

About the experiments we have a special help: Keizo Asami's Ghost! You may not know him. He gave a great help in negotiations between BRAZIL and Japan in order to build the LIKA. Sadly, he died before the great opening... Well, we believe that he haunts our experiments, in the best way possible of course. Occasionally we hear some weird noises, but we all know that it's only Keizo wanting to have some fun. Every time that something like that happens, our results get excellent! So, thank you Keizo!

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NEWSLETTER N°3

from August 25th to September 7th

PARIS BETTENCOURT

INTERVIEW OF A TEAM MEMBER

Hi, everyone, this is Paris Bettencourt team. Our team members come from all over the world, from france to Spain, to the US. This year, as you may remember from the movie project and sweat pad collection, we are working on smell body, hoping to eliminate unpleasant body odor with synthetic biology!

Today, we would like to introduce you a special team member of ours: Panthere Delasavane! She invites everyone to friend her on facebook! Panthere currently lives with team member Henry De Belly, and would soon move in with another member, Antonio Villarreal. She is an active participant of all team activities, from scientific ones to social ones. Today we interviewed her on her experience with the team.

On being a family
How do you like it that you are living with, working with and partying with iGEMers all the time?
Grrrrr, it is really funny to say how Henry behaves during work and at home. He is really different. He tries to be as serious as possible at work, but plays crazily loud music and drinks a lot of beers at home. So does Antonio. In fact, they are in the same indie rock band together. Grrrrr, it is almost hard to believe they are synthetic biologists. I laugh whenever I hear them introducing themselves as biologists. It also seems to be the case with other members on the team. For the past two months, I feel like living in an iGEM bubble that is full of smelly compounds, with this project, and also people I like in one way or the other. It's like a family and then you need to work hard to keep everyone together. You know, it seems I am always the parent of the team.

On international dinner
I heard you guys have international dinner every Thursday. How do you like it?
Grrrrr, oh man, it is like my favorite part of the week. We have had Mexican night, French night, Indian night and American night so far. Someone cooks every week and it is awesome. This is one of the advantages of having such an international team. I enjoy listening to drunken conversations that are filled with national prides, but also cultural lessons. Learning so much about different countries now.

On iGEM
I know you have worked for other labs before. How is iGEM different?
Grrrrrr, you know, as I said, iGEM makes me feel like a parent. It is really like being a PI, everyone on the team. You have to know the budget, build the team, interact with people with different specialties and come up with projects by yourself. I feel like a real scientist and inventor, not a panthere. I also like how it is not a super long project, so we get to see some results and hopefully feel good about ourselves.

Most important question! Are you coming to Boston?
Of course I am. I am the soul of the party and guardian of the team.

* Panthere is a stuff animal of Henry's. It does have a Facebook page that has been turned into a photo wall of iGEM activities. This all got started because Henry wanted to build a Tinder account for her, which is coming! Now, we regard it as team mascot and a storyteller of our iGEM experience. This interview of Panthere was translated by Henry De Belly. Friend Panthere Delasavane on Facebook! Follow Paris Bettencourt iGEM team!

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NEWSLETTER N°3

from August 25th to September 7th

PARIS SACLAY

OUR TEAM

Our team first participated in iGEM in 2012. In 2013 we received a gold medal at the European Jamboree.
We are made up of biologists, biochemists, mathematicians and computer scientists. We are mostly undergraduates.
We work closely with IGM (Institut de Genetique et de Microbiologie), which conducts research in genetics and microbial genomics.

OUR PROJECT

Certain ideas that would have been called nonsensical now are widely accepted as fact, such as Galileo's vision of Earth, or the theory of evolution. Such paradigm shifts have vastly changed the way we understand and define various phenomena.
What about synthetic biology then? Will it change the way we perceive the representation of life? To further reflect on the matter, iGEM Paris-Saclay has decided to take part in the new Art and Design track. We believe that art is a great vehicle to share our ideas with the general public. The physical manifestation of our thinking is... a lemon.
Allow us to elaborate before you scratch your heads in confusion. We intend to recreate a lemon that will smell like one, look like one and even "ripen" like one, yet not be one. Basically the "lemon" is E. coli that will express lemon colors and smells. We will mold agar to obtain a lemon shape.
The discussion that will follow is quite multifaceted. If we have a "fake" lemon with exactly the same characteristics as the natural version, would you say that the two are equivalent? Would you be willing to use these genetically engineered "lemons" in your food? What sort of impact would such lab-grown food have on the market? If we can modify bacteria to create artwork, could we consider moving on to multicellular organisms? These are just a few questions we could ask ourselves.
We have several methods to spread our message. As we are in the Art and Design track, we sought the help of artists, such as Lia Giraud (www.liagiraud.com), Marion Laval-Jeantet, and Christina Agapakis (agapakis.com). We will also participate in CURIOSITas (www.curiositas.fr), an art and science festival held annually at Université Paris-Sud. We will soon conduct surveys on BioArt: we wish to ask iGEM teams, artists, scientists, and anyone in between.
Let's move on to the technical aspects of the project. We will replace E. coli's foul odor with lemon fragrance and express yellow or green chromoproteins to evoke the ripening process of the fruit.
In order to express the smell we will first remove the gene responsible for E. coli's stench with homemade BioBricks that will synthesize limonene, citral and β -pinene, which are three essential molecules that are part of the fragrance of a lemon.
We use blue and yellow chromoproteins in our lemon: both will be expressed in presence of salicylate, and thus the lemon will give off a green hue. When the concentration of salicylate decreases, the blue chromoprotein will no longer be expressed and the lemon will be yellow.
So far we have two BioBricks (actually two-in-one): NAHR sup D which suppress the expression of the blue chromoprotein. We are currently working on the lemon scent BioBricks (i.e. limonene, β -pinene, citral)

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NEWSLETTER N°3

from August 25th to September 7th

POLYTECHNIC UNIVERSITY OF VALENCIA

ABOUT OUR TEAM

Our team started at the end of a lesson of the subject "Synthetic Biology".

Lucía and Jose realized they had a once-in-a-lifetime opportunity to participate in the iGEM as students, so they basically started stalking the instructors to start with our project. Alba and Alfredo showed their interest just a few weeks after, so we all four biotechnologists became labmates. Finally, Jana (Alejandra) and Iván, our engineers, joined the team along with an army of new instructors and advisors (One of them, Yadira, is in this team photo too).
Now, we are a team made of people from very different backgrounds working together to create our amazing Sexy Plant. We love what we are doing and we are going to rock this contest.

After a team meeting in July the students went to have lunch together near the engineer's headquarters at the end of our university campus. It was around 3 pm, close to 40 Celsius degrees outside and extremely humid atmosphere when we finished having lunch and we realized that we didn't want to sweat to dead. The biotechnologist of the team had to go back to the laboratory, which is about 20 minutes walking away from the restaurant, too long for walking in the sun in that weather. So we made our way to the laboratory crossing all the buildings with air conditioning we could find in our way, and resting in them for some minutes so we could cool down a little bit.

So we turned a 20 minutes walk into a 1 hour expedition through buildings we had never been in during all these years studying in our university.

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NEWSLETTER N°3

from August 25th to September 7th

STANFORDBROWNSPELMAN

ABOUT OUR TEAM

The Stanford-Brown-Spelman team is entering it's fourth year of participation in the iGEM competition. Partnered with the NASA Ames research center, the team focuses on issues related to astrobiology and aerial technologies. They enjoy spending their time soaking up the California sun, eating lots of good food, and of course, pipetting.

Meet Jotthe. Although she may be the tiniest (or as she would say tinniest) member of our team, her many contributions and accomplishments would indicate otherwise. Jotthe enjoys baking, dancing, scheduling appointments to finally get her driver's license, and of course, long walks on the beach. She also loves sharing pictures of her 15 month old nephew, discussing flag code, and drowning her quesadillas in hot sauce to mask the flavor of cheese. Although she despises the texture of cheese, Burrito Wednesday is quite possibly her favorite day to buy lunch in the cafeteria. As you can see, Jotthe is an intelligent, beautiful, and versatile bioengineer. With her unique interests and natural talent at baking cinnamon cakes, she's quite the catch.

- Poorwa Godbole, SBS iGEM 2014

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NEWSLETTER N°3

from August 25th to September 7th

SHEFFIELD

OUR TEAM

Our team consists of 8 undergraduate students from the University of Sheffield.

Sharan Nanuan - "Miniprep Queen", a second year student of Biochemistry and Microbiology. Not great at laser quest.

Alex Simpson - a second year Aerospace Engineer, in his own words "quite successful with middle aged women" (this may be taken out of context).

Ben Madden - a third year Chemical Engineer with a thing for bioreactors.

Mustafa Hussain – a second year Mechatronics and Robotics student with a thing for remote control helicopters.

Jianxing Qin - a second year student in Automatic Control and Systems Engineering originally from China.

Lara Grew – a second year geneticist, bit of a lad, skilled at aiming fluids into other guy's eyes.

Ben Lomax – stunningly attractive, massively intelligent, fantastically funny, and fairly modest first year molecular biologist.

Erika "Ethika" Otaviano – a third year Bioengineer. When it comes to ethics and consent forms for policy and practices research, she just can't get enough.

On Friday 18th of July we held a meet-up for some of the other UK iGEM teams. Widely considered a success, the main aims of the meet-up was to find out about other teams projects, and potentially collaborate with our new iGEM friends. After a hectic morning of putting up sign posts and ensuring refreshments would arrive on time, other iGEM teams arrived from Oxford, Kent, York and UEA. We had talks from guest speakers Professor Phillip Wright about his perspective on synthetic biology as a chemical engineer, and Rob Meckin, who explored the sociology of the human practices aspect of synthetic biology. Each team then gave a two minute presentation on their project, and we all enjoyed a game of networking bingo – a great way to get to know each other. We ended the meet-up with a poster session and refreshments, and began to talk about collaborating with each other.

After the meet-up we went out for post-meet-up drinks and a celebratory night on the town. Conversation began regarding what we should wear for our presentation in Boston. It was noted that many iGEM teams incorporate their own national dress into their outfits (such as the Tokyo Tech and TU-Munich 2013 teams). After an intense debate about what British national dress truly consisted of, one somewhat inebriated team member bought a bowler hat on eBay (at the insistence of a postgraduate supervisor) in a certain notorious Sheffield nightclub. It was most likely not worth the £20 spent on it.

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NEWSLETTER N°3

from August 25th to September 7th

TECHNION ISRAEL

OUR PROJECT

When we came up with the idea for our project we imagined a home detection kit for toxins, allergens and other substances. So while we are doing PCR's, run gels and document every step, we try not to forget what can be done with our work with some (a lot) more R&D, so we let our imagination sail and planed a home test, called "Safie".

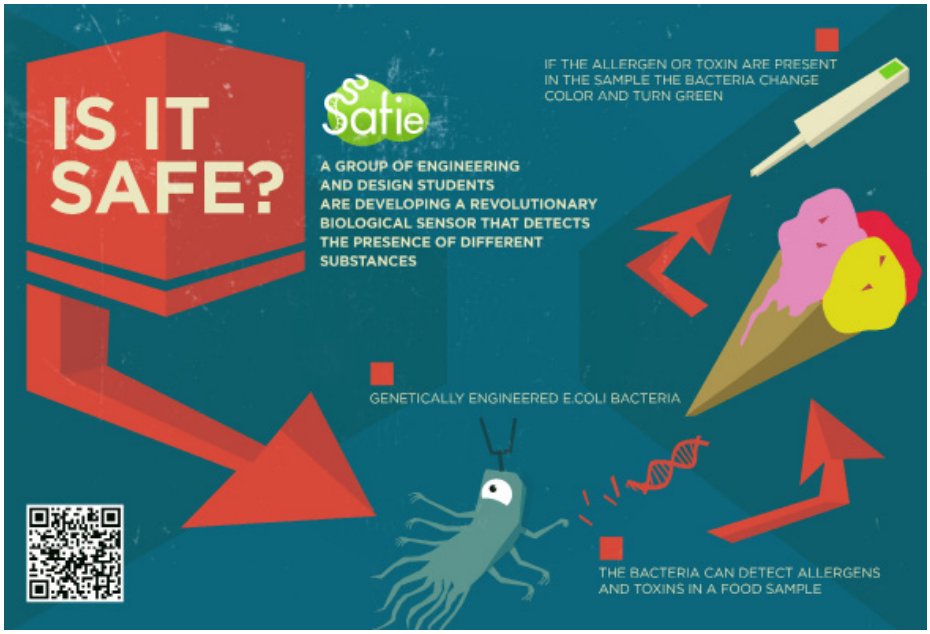
If you're allergic to peanuts, eggs or any other substance you know how important it is to be sure your dish doesn't contain the allergen – what if you could be sure the dish is safe?

Imagine you're going out to celebrate your mom's birthday. You're the only vegetarian in the family so you are forced to go to a non-veg restaurant – how can you be sure there is no egg or meat in your dish?

The answer is "Safie"!

You test, wait 10 minutes and know what is safe for you!

Let us know what you think of the name and the concept



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NEWSLETTER N°3

from August 25th to September 7th

UCSF & UCB

OUR PROJECT

Although UCSF & UCB's iGEM team has students from a variety of backgrounds and schools, we bonded very quickly and have had many fun and unexpected team bonding experiences. Some instances of team bonding occur during late night data collection, as team members stay until 11:00PM to collect and analyze data, even when they have to come in to lab early the next day, leading to impromptu conversations as they wait to collect data. One day, when we learned that one of us had never had In-n-Out (a popular Californian hamburger fast food restaurant) before, we decided to order some for what turned out to be a crazy but unforgettable lunch. An interesting fact is that many of our team have dietary restrictions or allergies: when we tried to bring snacks for the rest of the team, such as chocolate or banana bread, there would always be one or two people who would say, "I'm sorry, I can't eat that." Fortunately, we've been able to overcome minor difficulties like these and find snacks we can all enjoy, such as popcorn, pretzels, and hummus. Pretty much only popcorn, pretzels, and hummus.

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NEWSLETTER N°3

from August 25th to September 7th

WARSAW

OUR TEAM

We are a group of students mostly from Faculty of Biology at Warsaw University, though we also have members from other faculties and universities of Warsaw. Our group is the oldest one in Poland – this will be our 7th time in iGEM. So far we managed to win 6 medals: 2 bronze, 2 silver and 2 gold – the last one in last year's European competition finals in Lyon for our FluoSafe project. Although we love to spend all our free time in the lab, we also like to talk about science, Doctor Who and upload silly things on facebook.

OUR PROJECT

Our project consists of utilization of two-component system (PmrA-PmrB) from Salmonella enterica, which we used to detect and bind lanthanide ions.

Lanthanides is a group of fourteen elements in f block of the periodic table, which unique electronic properties make them irreplaceable in modern industry, such as electronic devices, catalysts and rocket science. Their deposits on Earth are limited, expensive to mine and difficult do refine.

Based on work of prof. He's group from University of Chicago we were able to use mutated version of PmrA-PmrB system, where FeBT (iron-binding tag) was replaced by LBT (lanthanide-binding tag).

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NEWSLETTER N°3

from August 25th to September 7th

NJU-QIBEBT

OUR TEAM

NJU-QIBEBT team is an iGEM team established on the basis of the cooperation between M3 Laboratory, School of Life Science, Nanjing University and Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences. The whole team includes 20 members and all of them are the sophomore and junior students from School of Life Science, Nanjing University. Advisers of the team are from Nanjing University and the Qingdao Institute of Bioenergy and Bioprocess Technology.

INTERVIEW OF A MEMBER

Hello iGEMers, I'm Zhou Yu from NJU-QIBEBT and you can call me Martin. I'm the team leader of our team. I'm a junior student from School of Life Sciences, Nanjing University.

This is the second time I participate iGEM. I'm looking forward to meet you guys in Boston, and hope you enjoy iGEM.

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NEWSLETTER N°3

from August 25th to September 7th

CAU-CHINA

OUR TEAM

WE ARE THE TEAM OF CHINA AGRICULTURAL UNIVERSITY, CAU-CHINA. FOR IGEM 2014, THERE ARE MORE THAN 20 MEMBERS IN OUR FAMILY AND THEY SPREAD FROM FRESHMEN TO JUNIORS IN CAU. IT IS THE INTEREST OF SYNTHETIC BIOLOGY AND THE AMBITION TO PROPAGATE IT THAT GATHERS US TOGETHER. THOUGH IT IS THE SECOND TIME FOR OUR TEAM TO TAKE PART IN THIS AMAZING INTERNATIONAL COMPETITION, FOR MOST OF US, IT IS THE FIRST CHANCE TO DIRECTLY JOIN IN THE BIG EVENT.
THIS YEAR, OUR IDEA CREATOR, MENGNI WANG, COMES UP WITH AN IDEA NAMED FROZEN BY E.COLI, INTENDED TO REALIZE A DYNAMIC PATTERN OF SNOW FLAKE WITH RED FLUORESCENCE GROWING UP FROM A POINT AUTOMATICALLY WITH E.COLI.

This year, our idea creator, Mengni Wang, comes up with an idea named frozen by E.coli, intended to realize a dynamic pattern of snow flake with red fluorescence growing up from a point automatically with E.coli.

Since last year, we have accomplished a series of tasks, such as Human Practice, Journal Club every week, e-book edition, team construction and so on. As members of our team, we get great pleasure from the process, especially from the activity of brainstorm.

To be a better team, there is still a long way to go, but luckily, we are all adamant about and enthusiastic at that.

OUR PROJECT

AMAZING FAIRY TALE LIKE FROZEN IN DISNEY, WE MAKE CUTE E.COLI A PRINCESS. THIS YEAR, CAU-CHINA TEAM WANTS TO MOVE THE FROZEN POWER FROM DISNEY TO E.COLI, THAT IS, A DYNAMIC PATTERN OF SNOWFLAKE EMITTING RED FLUORESCENCE, WHICH IS ACTUALLY COMPOSED OF COLONS OF E.COLI EXPRESSING RFP, STARTS TO APPEAR AND GROW UP GRADUALLY FROM A SINGLE POINT ONCE WE KINDLE IT. WE USE THE COMBINATION OF GENETIC-ENGINEERING, BELONGING TO SYNTHETIC BIOLOGY, AND CELLULAR AUTOMATON, AN AMAZING ALGORITHM IN MATH AND COMPUTING SCIENCE. TO ENSURE CUTE E.COLI ACCOMPLISH THE STABLE JOB, WE CONSTRUCT VARIOUS VECTORS. EVERY SINGLE COLON IN PLATE CAN BE INFLUENCED BY THE MOST ADJACENT CELL TMACHINE. AS A RESULT, WE GET A CHANGEABLE PATTERN IN A COMMON PLATE.

Figure and explanation:
In our project, we want to move the frozen power from Disney to E.coli, that is, a dynamic pattern of snowflake emitting red fluorescence, which is actually composed of colons of E.coli expressing RFP, starts to appear and grow up gradually from a single point once we kindle it, showing ideally in figure 1.

Plan for future steps:
Finish the constructing of vectors and transform the vector to the E.coli. Induce E.coli to express RFP in specific time and space. Then test the stability of the pattern and get the robust system to accomplish the snowflake pattern.

Figure 1. A dynamic pattern of snowflake with E.coli

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NEWSLETTER N°3

from August 25th to September

Tongji

OUR TEAM

We are team Tongji founded in 2013. All of our team members are from school of life sciences and technology. Our school also offers enough technology and money to help us.
Our team consists of students from bio-information major and biotechnology major. There is a protein research institute in our school. In that case, some members in our team have strong background of protein experiments.

INTERVIEW OF A MEMBER

SOMETHING SPECIAL

My high school classmate CAO told me that there would be an international competition in MIT. He was a student in Fudan University, who majored in Biology. He was also the captain of team Fudan. I was attracted by his words at that time.

Then I found my lab friend ZHOU, we talked about the iGEM and decided to communicate with our PI about this program. Also, my friend CHEN told me that HONG, who tried to build a team not long ago, was still interested in this project.

After we three communicated, we decided to start our project. Till now, we get support from our school and teachers. Our team member has made some achievements. Our Team member JIANG and ZHOU have devoted their vacation for the experiments. HONG and I also stay at school to help JIANG and ZHOU and to prepare for the trip to Boston.

I hope every team have fun and enjoy this event. Good luck!

Here are two photos of JIANG (left) and ZHOU, who did great job in the experiments.
Thank you for your work in the Lab!

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NEWSLETTER N°3

from August 25th to September 7th

SYSU-CHINA

OUR TEAM

SYSU-CHINA, THE EXPERIMENTAL IGEM TEAM FROM SUN YAT-SEN UNIVERSITY, P. R. CHINA IS HAVING GREAT FUN IN THE PROJECT THIS YEAR. THIS IS A TEAM OF DILIGENT ACADEMIC WORK AND AMUSING DAILY LIFE, AS SHOWED IN FOLLOWING ISSUES

18 members participated, we have worked more than 7 months from the beginning of the idea this year, and we do put in huge amount of time in lab, working as a team.

We have senior bro and sis who never feel tired joking and teasing each other and fresh meat who excessively inherited this happy atmosphere.
We have dinner and game together randomly, sharing cuisine and fun, and few weeks ago we had a fantastic trip to Taiwan.

We are happy to invite more talented fresh meat into SYSU-China, marching for great honor.

OUR PROJECT

Selection of high affinity binding proteins of a target has broad medical applications, which has attracted many researchers and pharmaceutical companies. Traditional selection process is time-consuming and inefficient, which hinders the development process.

This year, SYSU-China intends to make this process automatic and more efficient. We take advantage of the high proliferation rate of bacteriophage M13 and its artificially introduced DNA mutation to spontaneously establish a pool of candidate protein sequences carried in budding-deficient M13 genome. Those defective phages will infect E. coli hosts that carry the target protein, then M13 evolutional sequences are expressed. Due to bacterial-two-hybrid system in the host, only prospective proteins with high affinity will be capable of compensating the gene knocked-out in budding-deficient genome, resulting in budding of M13 with high-matching sequence.

Additionally, different culture temperature, which can be easily and automatically operated by machines, and a temperature-sensitive RNA thermometer are applied to our system to make it more controllable. Ideally, with specific time and precise temperature control, this system is able to select M13 phage carrying higher affinity protein sequences in a fermenter with access to quantitative control.

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NEWSLETTER N°3

from August 25th to September 7th

XMU-CHINA

OUR TEAM

Our team is made up of 23 ungraduate students members who were selected by rigorous screenings, 2 instructors of the Department of Bioengineering in Xiamen University, Baishan Fang and Grace I-Son Ng, and 2 advisors, one of whom is a member of 2013 XMU-iGEM team and another is a graduate student in Fang's group. 3 leaders among 23 members take charge of our team. Jianxing Huang is in charge of the trivial round, Chun Tang is responsible for experimental issue, and Fan Wu, the art design and Website.

OUR PROJECT

Chemtaxis,which can make strains move, interests us this time.By reprogramming the strain (CL-1), which lacks the CheZ gene, we can create mathematical patterns. CheZ gene belongs to chemotaxis family of E.coli. Protein CheZ can dephosphorylate CheY-P, one that allows E.coli swimming smoothly. The ΔCheZ bacteria can't dephosphorylate CheY-P, so the strain won't motile until CheZ is involved in. That means the motility of E.coli can be precisely control by stimulus (e.g. IPTG). We try to construct logic gene circuits to make E.coli recognize environmental stimulation, thus by utilizing the controlled chemotaxis which named pseudotaxis we could command bacteria to form patterns such as ellipse, hyperbola and so on.

Besides, we try to utilize pseudotaxis to accomplish some experimental meaning. As far as we know, the motile ability is proportional to the amount of protein CheZ in certain range. By measuring the average chemotaxis distance, we will get a precise evaluation on the RBS efficiency that is evaluated by fluorescence strength previously.

What is more, the intrinsic motivation that drive us striving for the above project is that we want to simulate the process of stem cell differentiation. In the organs development, stem cells differentiate while aggregate together to form heart, liver and kidney which have precise shapes. Perhaps some mathematical principles that govern the differentiation process. By simulating differentiation, we want to get a closer understanding of the differentiation process. However, E.coli can't sense as much stimulus as stem cell, we intend to utilize RNA aptamers which has the potential to response to almost all stimulus to cover that shortage. Thus, we can get a more precise stimulation.

Up till now, we have accomplished a original genetic loop, which we are struggling to characterize.

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NEWSLETTER N°3

from August 25th to September 7th

NAGAHAMA

OUR TEAM

iGEM Nagahama is a team of the second year after formed it. There are 6 members in our team. The theme of the iast year is AgRe Paper, Ecolink. We won the bronze medal. This year we'd like to acquire sponsors that we didn't come true last year. And win the gold medal.

OUR PROJECT

QUESTION:
WE ARE HAVING A HARD TIME OF MAKING PLASMID DNA.
HOW IS YOUR WORK OF ASSEMBLY GOING ALONG? WHAT KIND OF METHOD DO YOU TAKE IF FAVORABLE?

One E.coli-one function theory.
We make various systems by interaction of cell-cell communication. We keep one function in one E.coli. This means to make simple plasmid. The following is one example. We'd like to collect cadmium in water. Therefore we use two kinds of E.coli. One catches Cadmium. The other attracts all E.coli by using chemoattractant. Catches E.coli displays metallothionein a protein combines a heavy metal. Cadmium is a kind of heavy metal. The other synthesizes aspartic acid (Asp) one kind of chemoattractant. All E.coli gather in the E.coli synthesizes Asp. To use these E.coli, finally cadmium will be caught.

Plan for future steps:
We'd like to apply many kinds of organisms synthesize by using chemoattractant, hormone and so on. And we'd like to pervade and develop this simple system.

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NEWSLETTER N°3

from August 25th to September 7th

USTC-CHINA

OUR TEAM

Our team was established in November 2013 when iGEM 2013 has just finished. And we spent two weeks got on well with each other, acquainting with iGEM and summarized projects done previously. In the winter vacation, we were asked to learn the introduction of synthetic biology, molecular biology and bacterial genetic engineering. Later, standardized experiment was organized in our lab, and we all enjoyed success. In March to May, brainstorming played an important part in our work along with some human practice activity, which was a tough time for us to think, design and discuss. And finally, time for experimenting in lab goes as today.

Our team, working on biological imaging this year, challenges to use conception in engineering to organism. Sometimes you do not need to address a specific issues. Maybe you wannav do something innovative and satisfy our insatiable appetite for trying anything we are intrigued. This is what we are working on and attempting to make breakthrough.

INTERVIEW OF A MEMBER

We are collecting interview for our team member. Each one is gonna be interviewed with photos and questions about his or her feelings during in the team. For more interview of our members, please refer to our social network above.

As for our most excited experiment, it must be the trip to Taiwan. Presentation was prepared till 3 A.M. And we delightedly exchanged our ideas, introducing our project, making new friends and traveling in this beautiful island. Everything goes fresh and happy.

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NEWSLETTER N°3

from August 25th to September 7th

TSINGHUA-A

OUR TEAM

Tsinghua-A first entered the iGEM Jamboree in 2011 and progresses have been made ever since then. With instructors and team members from the Department of Automation, we have an advantage in modeling construction. We have team members from all kinds of departments, School of Life Science, Institute for Interdisciplinary Information Sciences and Department of Automation. We hope we can do better this year.

OUR PROJECT

QUESTION:

1、HOW TO OPTIMIZE OUR HELA CELL CULTURE IN DMEM MEDIA ?

2、IS THE DMEM COMPOSITION AFFECT HELA CELL CULTURE ?

The TALE assembly strategy uses the Golden Gate cloning method, which is based on the ability of type IIS enzymes to cleave outside of their recognition site. When type IIS recognition sites are placed to the far 5' and 3' end of any DNA fragment in inverse orientation, they are removed in the cleavage process, allowing two DNA fragments flanked by compatible sequence overhangs, termed fusion sites, to be ligated seamlessly. Since type IIS fusion sites can be designed to have different sequences, directional assembly of multiple DNA fragments is feasible. Using this strategy, DNA fragments can be assembled from undigested input plasmids in a one-pot reaction with high efficiency.

We chose the native TALE AvrBs3 as a scaffold for customized assembly of TALE constructs. The central DNA binding domain of AvrBs3 is formed by 17.5 tandemly arranged 34 amino acid repeats, with the last half repeat showing similarity to only the first 20 amino acids of a full repeat. To reduce the risk of recombination events between the 17.5 highly homologous repeat sequences, we codon-optimized avrBs3 applying the codon usage.

In a single Golden Gate cloning reaction, cloning efficiency is significantly reduced for assembly of 17 repeat modules. Therefore, we split the assembly in two successive steps. In the first cloning step, 10 repeats are assembled in one vector. The preassembly vectors confer SpecR and encode a lacZ- α fragment for blue/white selection. On both sides of the lacZ- α fragment a type IIS recognition sequence - BsaI - is positioned. Similarly, 11~17 repeats and NG-last-repeat are respectively ligated and inserted into another vector. After preassembly of the 10 and 7 and last repeats using BsaI, the intermediate blocks are released via Esp3I and cloned into the final assembly vector (modified pTAL1). Modified pTAL1 confers AmpR, and allows plasmid replication in E.coli. The vector pTAL1 also contains all elements of the final TALE expression construct, except the repeat modules.

Report System :

We construct a report system so as to test the reliability and efficiency of our 'Telling TALE'. In this section, we test the TALE's DNA binding ability and report it with a common report gene 'RFP'. We attempt to put the target of TALE's DNA binding target sequence inside the expression cassette of report gene and binding TALE can disrupt the express of report gene. We use iGEM standard parts to build our report system.

Plan for future steps:

Better modeling in the optimization of the TALE.
Golden Gate Assembly of the optimized TALE coding sequence.
Construction of the Report System.

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NEWSLETTER N°3

from August 25th to September 7th

BRAWIJAYA UNIVERSITY

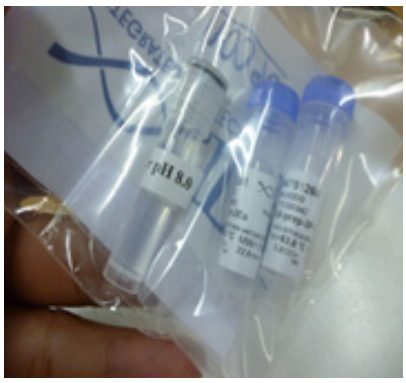
OUR TEAM

We are start from December 2013 when we invited ITB iGEM Team 2013 for iGEM socialization. This agenda initiated our campus to join iGEM competition 2014. On March, our team has been formed. The member composition include biology, engineering, and computer sciences. Then we start discuss about project that will be our project in iGEM 2014. After all, we decided to chose the theme about cervical cancer. This is our team , UB iGEM Team that bring project title "Cervical Cancer Care". This is the first time for us join in iGEM competition, hopely we can do the best and give the best for our project.

OUR PROJECT

UB iGEM Team will try to make reconstructed bacteria for cervical cancer care. It divided by 3 modules, there are screening, preventing and treatment module. On screening module we try to make a diagnostic kit to detect cervical cancer. Tea bioactive extraction will be one of the preventing solution for cervical cancer and for the last module, UB iGEM Team will try to make kit test for screen herbal active compounds that inhibit cervical cancer.

Now, We are still on laboratory work. For this week we are try to culture the HeLa cells and make Media Culture for E.coli. We have some problems on laboratory such as make wrong solution for bacteria media culture. In other case we had failure to culture the HeLa cells.



Plan for future steps:

We are trying to fix the steps in preparation tools and materials. We will try to grow E. coli in culture medium that has been made and tried to test the HeLa cell resistance to certain active compounds.

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NEWSLETTER N°3

from August 25th to September 7th

ZJU-CHINA

OUR TEAM

OUR PROJECT

GENE SOCKET: The assembly of genetic circuits is a big gap between theory and achievement in synthetic biology. Many well-known methods, from restriction endonuclease, 3A assembly to Gibson assembly, aim to overcome the difficulties. This year, ZJU-CHINA hope to build a gene-insertion system in bacterial chromosome, «Gene Socket». Different from the in vivo constructing methods mentioned before, Gene Socket can be used to constructing genetic circuits in chromosome directly as well as be combined with existing in vivo methods, which can make gene expression more accurate, stable and controllable.

Two core methods, lambda red recombination and recombinase-based bistable switch are applied to build our Gene Socket. Lambda red recombination is a widely used, efficient recombination system in prokaryotes. Recombinase-based bistable switch is relatively more stable and easier than transcription factor regulated bistable switch modules. Both the two are the best choices for achieving the characteristics of Gene Socket.

We hope that by using standardized Gene Socket, synthetic biologists can turn their theoretical design into reality faster and better, concentrating more on the designing and improvement of genetic circuits.

Photo-reversible magnetization of cells:
Attach bacterial cells with megnetosomesto allow magnetism controlof cell movement and selection.

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NEWSLETTER N°3

from August 25th to September 7th

WHU-CHINA

OUR TEAM

This is the fifth year iGEM-WHU has enjoyed the iGEM Festival. With the great leadership of Hao-yuan Sun and the rich knowledge and experience of Zhao-ning Wang, our team members consist of undergraduates form College of Life Science, College of Pharmacy, School of Basic Medicine and School of Mathematics and Statistics. Even though majoring in various professions, we pull together and give full play to superiority in multi-fields to construct the project. Furthermore, most of our members are sophomores and junior students. And it is because of the youth and vitality that we never scrupled to discuss sharp ideas and practice them.

OUR PROJECT

Formaldehyde, a common chemical reagent diffusely applied in some industries like building materials, textile, medicine and food, has caused countless diseases, which seriously threaten the health and living conditions of human. However, from our investigation, there are many methods to detect and to clear it whereas we had never found the way to combine the two procedures in literature before. Thus, we are aiming to design a complete and excellent system that can detect, clear and exhibit the effect of removing formaldehyde. To realize the goal, we constructed three subsystems. The first one is the detection system. This system can sense the existence of the formaldehyde molecules. The second one is the clearing system. After the biochemical pathway featured by two enzymes (PADH and FDH), formaldehyde can be transferred into formic acid and then be digested into carbon dioxide. The third system is the exhibition system, a sophisticated twice coloration mechanism, which can clearly tell us the amount and concentration of the formaldehyde, is used to exhibit the existence or elimination of it.

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NEWSLETTER N°3

from August 25th to September 7th

TIANJIN UNIVERSITY

OUR TEAM

THE TEAM HAS KNOWN SEVERAL SUCCESSES IN THE INFORMATION PROCESSING TRACK OF THE COMPETITION. THIS YEAR, WE ARE SEVEN HIGHLY MOTIVATED STUDENTS FROM DIFFERENT BACKGROUNDS, AIMING TO ROCK THE INFORMATION PROCESSING TRACK ONCE AGAIN. THE INTERACTION BETWEEN WET LAB AND DRY LAB IS CRUCIAL FOR OUR TEAM.

Tianjin University IGEM team is one of the first entries to attend the IGEM competition in China. We started our IGEM journey from 2007 and we won a gold medal on our first try. Last year,our project AlkSensor won the gold medal and Best Poster award.

This year we form a team of 16 students from different majors of the school of chemical engineering. Not only seeking help from our instructor, we are planning to launch a series of interchange activities with other teams and Chinese Academy of Sciences. We also pay a lot of attention to team building. Creating a comfortable atmosphere and maintaining a stable and amicable relationship are also crucial for a successful team work.

Something funny, interview of a member, a advisor or an alumni, or a self-introduction of a member (just something casual and fun to write for you):
Last week, our team visited Tianjin Institute of Industrial Biotechnology, Chinese Academy of Sciences, sharing some perspectives of our project and discussing the direction of further application.

After providing them with our preliminary plan, we ask professors there about our weakness and difficulties, concentrating on the potential applications of our project. In addition to the detection of the concentration of certain micro-molecules or macro-molecules, we may also measure the expression level of different promoters by using our platforms.

OUR PROJECT

Biosensors are becoming more and more indispensable tools in life science, medicine, chemistry and biotechnology, which are greatly enhanced by synthetic biology. Yet in the bio-sensing procedure, the limitations of signal output methods restrict the usage and practicality of biosensors. Wildly used reporters such as chromophore and fluorescent protein which requires laboratorial equipments to measure often result in the loss of accuracy and immediacy.

Thus our project is focus on the bio-signal transformation to diversify output methods of biosensor. In account of the high maturity of silicon analysis, it will be a great advantage to transduce biological sense into electric signal.

Following this idea, we design a transducer which can convert the change of gene expression level that stimulated by inducer directly into the electric signal via inductive synthesis（or destroy）of nanowire between the electrodes. Curli fiber, a well characterized amyloid fiber which forms β-sheet-rich amyloid fibers, seems to be an ideal foundation of our nanowire structure. CsgA, the modified morphon protein of curli fiber with the ability to bind nano gold particles, will play the role as the conductor.

Once we synthesize conductive curli fiber, there are two approach to carry out the target sensing, by inductively synthesizing the conductive fiber between the electrodes to turn on a switch for connecting a open circuit, or inductively expressing the gene coding the curli-degrading enzyme to destruct the pre-synthesized nanowire. The change of the electric current shall represent the concentration of inducer.

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NEWSLETTER N°3

from August 25th to September 7th

NEAU-HARBIN

OUR TEAM

OUR PROJECT

ASPERGILLUS NIGER IS ONE SPECIES OF FILAMENTOUS FUNGI WHICH HAVE BEEN WIDELY EMPLOYED IN THE FERMENTATION INDUSTRY, AND BECOME A PRINCIPAL SOURCE OF ENZYMES AND METABOLITES. WITH FEATURES SUCH AS LOW COST AND HIGH PRODUCTIVITY AND GENERALLY REGARDED AS SAFE (GRAS) STATUS IN THE FOOD AND FOOD PROCESSING INDUSTRY, ASPERGILLUS NIGER HAS ACHIEVED INCREASED ATTENTION AS HOST FOR THE PRODUCTION OF HETEROLOGOUS PROTEINS, SUCH AS AMYLASE, ACID PROTEASE, CELLULASE, PECTINASE AND GLUCOSE OXIDASE, ETC.

In this study, we aim to establish one visual operation system of continuous target gene replacement using Aspergillus Niger. Firstly, a construct contains amilCP gene, which produces blue chromoproteins, and cjBlue, which produces green chromoproteins, fused selective marker gene HPH was made and transformed into the high expression site through homologous recombination in the Aspergillus Niger genome. In this construct, amilCP gene was driven by GlaA5 promoter, and followed by GlaA3 terminator; the HPH and cjBlue fusion gene was driven by pgpdA promoter, and followed by GlaA3 terminator. GlaA5 and GlaA3 can be used as homologous arm sequences that can mediate specific recombination. The selected HPH resistant Aspergillus Niger cell will highly express amilCP and cjBlue protein which can be detected by blue color and cjBlue signal. After several generations, homologous recombination will happen between the two GlaA3 sequences, and lead to the loss of HPH and cjBlue, then get the transgenic Aspergillus Niger cells only express amilCP gene which can be easily detected by blue color. These transgenic Aspergillus Niger cells with blue color can be used as original strain for target gene transformation. Those colonies without blue color will be the real transformants in which amilCP gene is replaced with the target gene. In a word, the visual gene operation system in Aspergillus Niger will be established with which the homologous recombination of target genes will be easily traced by detecting the color of colonies.

So far we have finished the expression vectors construction. The genetic transformation work is in the process.

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